

REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-16 remain active in this application.

By way of summary, the drawings are objected to; the specification is objected to; Claims 1, 3, 7, 9, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff (U.S. Pat. No. 4,513,317) in view of Trumball (U.S. Pat. No. 6,454,411) and further in view of Deering (U.S. Pat. No. 6,717,578) and Butler (U.S. Pat. No. 5,528,677). Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff, Trumball, Deering and Butler and further in view of Ritter (U.S. Pat. No. 6,657,538); Claims 4, 5, 10, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff, Trumball, Deering and Butler and further in view of Smyth (U.S. Pat. No. 5,726,916). Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruoff, Trumball, Deering and Butler and further in view of Chen (U.S. Pat. No. 5,852,489).

The objection to the drawings states that “the following reference character [is] not mentioned in the description: 52 of Figure 1.” In response, the Applicant draws the Examiner’s attention to the specification, page 6, line 2, which describes “the pupil 52 . . .”

In response to the objection under 37 CFR 1.177(b), the specification has been amended to include appropriate section headings.

Applicants acknowledge with appreciation the indication that Claims 5, 11, and 16 include allowable subject matter.

Briefly recapitulating, Claim 1 is directed to a system for transmitting video data from a digital database to a virtual retinal display device, wherein the video data is filtered, prior to its transmission, according to the current eye position of a viewer, such that outer

picture regions which are projected on the retina outside the fovea have a lower resolution than inner picture regions projected on the retina. By storing video data with full resolution and filtering the video data for reduced resolution only prior to the transmission of the video data, the invention makes possible, for example, user-independent storage of the video data and user-dependent transmission of the video data. In addition, applicant's claimed system reduces the transmission times for transmission of video data over a telecommunications network.<sup>1</sup> Independent Claims 7 and 13 are directed to alternative embodiments of Applicants' disclosed inventions.

Ruoff describes a differential resolution television display system including an eye tracker.<sup>2</sup> Data about the viewer's line of sight is transmitted from the eye tracker to a television camera.<sup>3</sup> Depending on the line of sight, both the camera and the television display have a selectable high-resolution and low-resolution scan mode.<sup>4</sup> The scan mode is selected based on the viewer's line of sight, which controls the position of the high resolution zone viewed by the camera.<sup>5</sup> However, the Office Action correctly notes that Ruoff does not describe a virtual retinal display, the storage of video information in a digital database, the filtering of that stored video information, or the explicit presence of a telecommunication network.

The Office Action attempts to correct these deficiencies with the virtual retinal display of Trumbull, the digital database and sample-to-pixel filter of Deering, and the telecommunication network of Butler. However, Applicants submit that this combination of four references is an improper hindsight reconstruction of Applicants' invention. Furthermore, applicant submits that this four reference hindsight reconstruction fails to anticipate all the elements of the independent claims. Moreover, there is no motivation to

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<sup>1</sup> Specification, page 1, lines 23-25,

<sup>2</sup> Ruoff, Abstract

<sup>3</sup> Id.,

<sup>4</sup> Id.,

<sup>5</sup> Id.,

combine these four references even if they described all the limitations. In fact, Trumbull teaches away from any combination with Ruoff. Details follow.

Trumbull describes a virtual retinal display system with an eye convergent sensing system determining the convergence angle of the eyes based on the direction in which a user's eyes are looking.<sup>6</sup> The eye convergence sensing system is connected to an image database for selecting, based on the eye convergence angle, different images for display to the user.<sup>7</sup> Thus, depending on the viewing distance, different angles can be displayed to the user.<sup>8</sup> However, Trumbull as implied by the official action, does not disclose Applicants' claimed video filter module, which filters the stored video data, *prior to their transmission*, on the basis of received current eye positions such that outer picture regions, corresponding to the video data, which are projected on the retina outside the fovea have a lower resolution than inner picture regions.

In fact, Trumbull not only fails to disclose Applicants' claimed filter module, Trumbull actually *teaches away* from filtering images prior to transmission, stating that "rather than waiting for the next whole frame of data, such as in standard practice, which could cause objectionable latency, each sweep of the beam should be controlled according to the latest data regarding the location of the fovea. Thus, another aspect of the [invention] includes the method and apparatus for tracking the eye and linking with the display apparatus so that the zone of high resolution remains aligned with fovea."<sup>9</sup> More particularly, Trumbull describes a display device which creates a high resolution zone with an elliptical scan pattern.<sup>10</sup> On the other hand, Ruoff describes controlling the resolution of a camera to create a high resolution zone.<sup>11</sup> Hence, Trumbull teaches away from Ruoff because Ruoff controls the

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<sup>6</sup> Trumbull, Abstract.

<sup>7</sup> Trumbull, col. 8, lines 15-33.

<sup>8</sup> Trumbull, col. 8, lines 33-44.

<sup>9</sup> Trumbull, col. 7, lines 53-60.

<sup>10</sup> Trumbull, col. 2, lines 54-56.

<sup>11</sup> Ruoff, col. 2, lines 22-26.

resolution at the camera, prior to transmission, “which could cause objectionable latency.”<sup>12</sup>

Thus, one of ordinary skill in the art would not be motivated to combine Ruoff and Trumbull,<sup>13</sup> because Trumbull teaches away from Applicants’ claimed invention.

In addition, it is impossible for the images from Trumbull’s database to be displayed to the user of Ruoff’s television display with different resolution upon the user’s fovea, because Ruoff’s display system relies on a differential resolution camera. Therefore, Ruoff’s differential resolution camera cannot be used to access Trumbull’s database without “changing the principle of operation of the primary reference or rendering the reference inoperable for its intended purpose.”<sup>14</sup>

Deering describes a graphics system with a super-sampled sample buffer which stores a number of samples which may be far greater than the number of pixel locations on the display,<sup>15</sup> i.e. a graphic system which generates and stores more than one sample for at least a subset of the pixel locations on the display.<sup>16</sup> According to Deering, the graphic system allocates different numbers of samples and different amounts of processing power to different areas of a display that will be perceived by different regions of the human visual system.<sup>17</sup> Deering describes a sample-to-pixel calculation unit which is configured to read the sample from the super-sampled sample buffer and filter the samples into respective output pixels.<sup>18</sup> The sample-to-pixel calculation unit selects one or more samples and filters them to generate an output pixel for the display.<sup>19</sup> In short, Deering generates and stores data with different resolutions for different areas of the eye and produces output pixels for display of constant resolution in all parts of the display; whereas, Claim 1 recites filtering stored video data such

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<sup>12</sup> Trumbull, col. 7, lines 53-60.

<sup>13</sup> MPEP §2145 (X)(D)(2) “It is improper to combine references where the references teach away from their combination.” citing *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983).

<sup>14</sup> MPEP §2145 (III).

<sup>15</sup> Deering, col. 3, lines 59-62.

<sup>16</sup> Deering, col. 3, lines 56-59.

<sup>17</sup> Deering, col. 5, lines 1-7.

<sup>18</sup> Deering, col. 4, lines 1-5.

<sup>19</sup> Deering, col. 4, lines 11-13.

that video data which are projected on different parts of the retina have different resolutions and thus different quantities of video data.

Furthermore, contrary to the Office Action, Deering does not describe Applicants' claimed filter module, which filters stored video data such that different picture regions, corresponding to video data which are projected on different parts of the retina, have different resolutions and thus different quantities of video data. The Office Action cites the Deering description of "the sample-to-pixel calculation unit, in varying the number or samples used, preferably varies the extent of the filter (e.g., the radius of the filter if a circularly symmetrical filter is used) used for generation of respective output pixels, which affects the number of samples used in calculating the output pixel (in addition the rendering unit could have already varied the sample density)."<sup>20</sup> However, filtering samples for a sample-to-pixel calculation unit, as described by Deering, reduces the computation time required to render each pixel. On the other hand, the present invention claims filtering the video data (pixels) prior to transmission. The *transmission* time reduction achieved by the present invention is altogether different from the *computation* time reduction achieved by Deering.

Applicants have also considered Butler, Ritter, Smyth, and Chen and submit these references do not cure the deficiencies of Ruoff and Trumbull. Indeed, none of the cited documents describe a filter module which filters stored video data on the basis of current eye position data such that picture regions corresponding to video data projected on the retina outside the fovea have a lower resolution than picture regions corresponding to video data projected on the fovea. As none of the cited prior art, individually or in combination, disclose or suggest all the elements of independent Claims 1, 7, and 13, Applicants submit the inventions defined by Claims 1, 7, and 13, and all claims depending therefrom, are not

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<sup>20</sup> Deering, col. 5, lines 60-65.

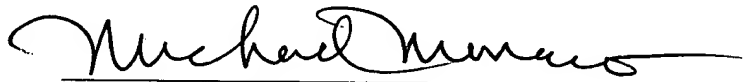
anticipated and are not rendered obvious by the asserted prior art for at least the reasons stated above.<sup>21</sup>

Furthermore, Applicants submit there is no teaching, suggestion, or motivation, either explicitly or implicitly, in either reference to combine the retinally stabilized differential resolution television display of Ruoff with the devices of Trumbull or Deering to arrive at the Applicants' inventions recited in Claims 1, 7, and 13. Thus, Applicants submit it is only through an impermissible hindsight reconstruction of Applicants' invention that the further rejection of Claims 1, 7, and 13 in view of these references can be understood.<sup>22</sup>

Accordingly, no further issues are believed to be outstanding and the present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested. In addition, Applicants respectfully request that Examiner acknowledge the IDS filed December 18, 2001.

Respectfully submitted,

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<sup>21</sup> MPEP § 2142 "...the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

<sup>22</sup> MPEP § 2143.01 "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge of one of ordinary skill in the art."